

IN THE CLAIMS

1 1. (Canceled)

1 2. (Canceled)

1 3. A galvanizing roll assembly intended to be submerged in molten
2 metal, comprising:

3 an arm;

4 a strip-engaging roll having a trunnion member, the trunnion
5 member having a trunnion axis;

6 a self-aligning bearing supporting the trunnion member on
7 the arm for rotation about the trunnion axis, said self-aligning bearing including a
8 roller-bearing,

9 the trunnion member having an outer cylindrical bearing
10 surface;

11 the arm having a bearing housing member having an
12 opening with an inner cylindrical bearing surface, for receiving the trunnion
13 member in a generally coaxial position;

14 a plurality of elongated rollers disposed between the trunnion
15 member and the bearing housing member, the rollers each having a longitudinal
16 axis supported parallel to the trunnion axis; and

17 a roller carrier having an elongated recess for receiving each
18 of the rollers for rotation within a respective recess, the roller carrier being
19 connected to one of said members such that the rollers roll with the other of said
20 members.

1 4. (Currently Amended) A galvanizing roll assembly as defined in
2 claim 3, in which each of the recesses has an open, partially cylindrical recess
3 wall, each of the rollers having a cylindrical wall, mounted in its respective recess
4 to define [an] annular clearance [between each of the rollers and its respective
5 recess wall] for passing a hydrodynamic lubricating molten metal film between
6 the roller and the recess wall as the roller is being rotated in a bath of a molten
7 metal.

1 5. A galvanizing roll assembly as defined in claim 3, in which the
2 trunnion member is attached to the roll to rotate therewith.

1 6. A galvanizing roll assembly as defined in claim 3, in which the arm
2 assembly has self-aligning capability.

1 7. A galvanizing roll assembly as defined in claim 3, in which the self-
2 aligning bearing, including the trunnion member, the bearing housing member,
3 and the plurality of elongated rollers are each formed of an alloy material that is
4 relatively insoluble in molten zinc, molten aluminum, or mixtures thereof, and

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5 contain an alloy material with a hardness $R_c > 25$ at the molten metal operating
6 temperature.

1 8. A galvanizing roll assembly as defined in claim 3 [7], in which the
2 alloy material includes an alloy material comprising by weight:

Percent		
.30	< Carbon <	1.80
0.0	< Chromium <	12.0
3.0	< Tungsten <	14.0
3.0	< Molybdenum <	14.0
20.0	< Iron <	50.0
0.0	\leq Vanadium <	4.0
0.0	\leq Niobium <	4.0
4.0	\leq Cobalt <	20.0
0.0	\leq Boron <	1.0
0.0	\leq Manganese \leq	1.0
0.0	< Silicon <	3.0

1 9. (Canceled)

1 10. (Canceled)

1 11. (Currently Amended) In a galvanizing roll assembly as defined in
2 claim 21 [9], in which the bearing means is carried within the roll.

1 12. (Currently Amended) In a galvanizing roll assembly as defined in
2 claim 21 [9], in which the rollers form a multiple line bearing contact between said
3 bearing structures.

1 13. (Canceled)

1 14. (Canceled)

1 15. (Original) A galvanizing roll assembly intended to be submerged in
2 molten metal, comprising:
3 an arm;
4 a strip-engaging roll having a trunnion;
5 a self-aligning bearing supporting the trunnion on the arm,
6 said self-aligning bearing including a roller-bearing,
7 said arm, said roll and said self-aligning bearing each
8 comprising alloy materials that present low solubility with a particular molten
9 metal in which they are to be submerged and having a high hardness, $R_c > 25$, at
10 the molten metal operating temperature;

11 the trunnion member having an outer cylindrical bearing
12 surface;

13 the arm assembly having a bearing housing member having
14 an opening with an inner cylindrical bearing surface, for receiving the trunnion
15 member in a generally coaxial position;

16 the trunnion member having a trunnion axis;

17 a plurality of elongated rollers disposed between the trunnion
18 member and the bearing housing member, the rollers each having a longitudinal
19 axis supported parallel to the trunnion axis;

20 a roller carrier having an elongated recess for receiving each
21 of the rollers for rotation within a respective recess, the roller carrier being
22 connected to one of said members such that the rollers roll with the other of said
23 members; and

24 each of the recesses having an open, partially cylindrical
25 recess wall, each of the rollers having a cylindrical wall, and including an annular
26 clearance between each of the rollers and its respective recess wall for passing
27 a hydrodynamic lubricating molten metal film between the roller and the recess
28 wall as the roller is being rotated in a bath of a molten metal.

- 1 16. (Currently Amended) A galvanizing roll assembly as defined in
2 claim 22 [15], in which the alloy materials comprise by weight:

Percent		
.30	< Carbon <	1.80
0.0	< Chromium <	12.0
3.0	< Tungsten <	14.0
3.0	< Molybdenum <	14.0
20.0	< Iron <	50.0
0.0	\leq Vanadium <	4.0
0.0	\leq Niobium <	4.0
4.0	\leq Cobalt <	20.0
0.0	\leq Boron <	1.0
0.0	\leq Manganese \leq	1.0
0.0	< Silicon <	3.0

- 1 17. (Currently Amended) In a galvanizing roll assembly including a
2 supporting arm, a roll rotatable about a roll axis, a bearing apparatus useful for
3 supporting the roll on the supporting arm for transferring a heated steel strip in a
4 bath of molten zinc, molten aluminum or mixtures thereof, said bearing apparatus
5 comprising:

6 structure on the roll having a bearing opening;

7 a trunnion;
8 an arm supporting the trunnion [trunniion] in a fixed position
9 with respect to the arm, the trunnion being rotatably receivable in the bearing
10 opening to support the roll for rotation with respect to the arm, and the trunnion
11 and the bearing opening defining a clearance therebetween for passing a
12 hydrodynamic film of molten zinc, molten aluminum or a mixture thereof
13 therethrough.

1 18. (Original) In a galvanizing roll assembly as defined in claim 17, in
2 which the roll has an end opening, and the bearing apparatus is supported in
3 said end opening.

1 19. (Currently Amended) A galvanizing roll assembly as defined in
2 claim 4, in which the molten metal hydrodynamic film forms a cushion between
3 the roller and the recess wall.

1 20. (Currently Amended) In a galvanizing roll assembly as defined in
2 claim 17, including a wear sleeve mounted on the trunnion in the bearing
3 opening.

1 21. (New) In a galvanizing roll assembly a bearing apparatus
2 useful for supporting a roll for transferring a heated steel strip in a bath of molten
3 zinc, molten aluminum or mixtures thereof, said bearing assembly comprising:

4 a roll (100) rotatable about a roll axis;
5 a supporting arm;
6 a trunnion member (102), carried on the supporting arm, the
7 trunnion member having a longitudinal trunnion axis fixed with respect to the arm;
8 a self-aligning bearing means carried by the roll and
9 supported by the trunnion member such that the roll rotates with respect to the
10 trunnion member; including:
11 a housing (126) fixedly mounted in the roll;
12 first annular bearing structure (146) rotatably mounted in the
13 housing and having a cylindrical inner surface fixedly mounted on the trunnion
14 member, and an outer surface having an annular partially spherical bearing
15 surface disposed around the trunnion member;
16 second annular bearing structure fixedly mounted in the
17 housing, the second annular bearing structure slidably engaging the partially
18 spherical surface of the first annular bearing structure to permit the roll axis to
19 swing within an acute angle with respect to the fixed axis of the trunnion member
20 as the roll is rotating;
21 a plurality of elongated rollers (164) disposed between said
22 first and second bearing structures, the rollers each having a longitudinal axis
23 supported parallel to the trunnion axis; and
24 a roller rocking cradle (160) having an elongated recess for
25 receiving each of the rollers for rotation within a respective recess, the roller

26 cradle being connected to one of said bearing structures such that the other
27 rollers roll with the said one of said bearing structures.

1 22. (New) In a galvanizing roll assembly, including:

2 an arm;

3 a rotatable rotating roll;

4 a trunnion shaft having an axis and carried on the roll, so as
5 to be rotatable therewith;

6 a self-aligning bearing means mounted on the arm for
7 supporting the roll for rotation comprising:

8 a housing fixedly mounted on the roll;

9 first annular bearing structure movably mounted in the
10 housing and having a cylindrical inner surface of a rotatably mounted on the
11 trunnion shaft, and an outer surface having an annular partially spherical bearing
12 surface disposed around the trunnion shaft;

13 second annular bearing structure fixedly mounted in
14 the housing and having a fixed bearing axis, the second annular bearing
15 structure slidably engaging the partially spherical surface of the first bearing
16 structure to permit the roll axis to swing with respect to the fixed bearing axis;

17 a plurality of elongated rollers disposed between said
18 bearing structures, the rollers each having a longitudinal axis supported parallel
19 to the trunnion axis; and

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20 a roller cradle having an elongated recess for receiving each
21 of the rollers for rotation within a respective recess, the roller cradle being
22 connected to one of said bearing structures such that the rollers roll with the
23 other of said bearing structures.